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ALAMEDA POINT
SSIC NO. 5090.3

IN REPLY REFER TO:

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Ser 105/026

19 APR 2000

From: Commander, Pearl Harbor Naval Shipyard and Intermediate Maintenance Facility
To: U.S. Environmental Protection Agency, Region IX (Attn. Anna-Marie Cook)
California Department of Toxic Substances Control, Region 2 (Attn. Mary Rose Cassa)

Subj: SUBMITTAL OF NAS ALAMEDA HISTORICAL RADIOLOGICAL ASSESSMENT (HRA), VOLUME I, NAVAL NUCLEAR PROPULSION PROGRAM

Ref: (a) COMNAVSHIPYDPEARL ltr Ser 105/058 of 6 July 1998
(b) California DTSC ltr from Ms. Mary Rose Cassa of 8 September 1998
(c) TechLaw Inc. comments for the NAS Alameda HRA, Volume I, Draft of 13 January 2000

Encl: (1) Pearl Harbor response to EPA contractor comments

1. Pearl Harbor Naval Shipyard submitted Volume I of the Historical Radiological Assessment (HRA) for Naval Air Station (NAS) Alameda via reference (a) in July 1998. This HRA is intended to serve as a Preliminary Assessment (PA) for radionuclides under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), and addresses radionuclides associated with the Naval Nuclear Propulsion Program (NNPP). A draft of Volume II, addressing general radioactive material (G-RAM; non-NNPP issues), was submitted on 28 September 1998.

2. In reference (b), the California Department of Toxic Substances Control (DTSC) stated that they had no comments on the draft NAS Alameda HRA Volume I. In a telephone call with USEPA Region IX (Ms. Anna-Marie Cook) on 14 February 2000, the EPA stated that they were satisfied with the HRA draft and that no further response was required by the Navy. At Pearl Harbor's request, EPA forwarded a fax copy of reference (c), which presents comments by EPA's contractor, TechLaw, following its review of the NAS Alameda Volume I draft. Although EPA indicated that no response is necessary, enclosure (1) presents Pearl Harbor's response to the reference (c) comments.

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3. Volume I of the NAS Alameda HRA Final includes administrative corrections and improvements which have been made in response to comments furnished by EPA and the California Department of Toxic Substances Control on Volume II of the NAS Alameda HRA Draft. Replies to those comments will be discussed in a separate letter.

4. This letter forwards the final version of Volume I of the NAS Alameda HRA, which includes the original of spliced USGS maps of the region. A copy of the HRA, along with all correspondence concerning this HRA and the HRA references, will be distributed to the Alameda Main Library and the Alameda Point Information Repository for public information. The Navy will inform the NAS Alameda Restoration Advisory Board of the availability of the HRA at an upcoming meeting.

G. CROWELL
By direction

Copy to:
California Department of Health Services, Environmental Management Branch (Penny Leinwander)
San Francisco Bay Regional Water Quality Control Board (Mark Ruderman)
Naval Facilities Engineering Command, Southwest Division (Michael McClelland)

SUBJ: **PEARL HARBOR RESPONSE TO EPA CONTRACTOR (TechLaw) COMMENTS ON NAS ALAMEDA HISTORICAL RADIOLOGICAL ASSESSMENT (HRA), VOLUME I, DRAFT**

GENERAL COMMENTS:

1. **TechLaw Comment**: The Draft Historical Radiological Assessment, Naval Air Station Alameda Volume 1 , Naval Nuclear Propulsion Program, 1966-1997 (the HRA) may not fully address all potential sources for radioactive material releases at Alameda Point. The HRA focuses on the potential for releases from naval reactor power plant operation, maintenance, and repair. However, the HRA neither addresses, nor rules out other possible radioactive sources, such as sealed source instruments or luminescent dials. The HRA should indicate whether these sources were present at Alameda Point and address the possibility that these sources may have released radioactivity to Alameda Point.

2. **TechLaw Comment**: The HRA focuses on releases of cobalt-60 from the NNPP and its presence in the environment as an indication of whether or not the NNPP has had a significant effect on radiation levels in the environment. The basis for this is that cobalt-60 is the predominant long-lived radionuclide in the propulsion reactor cooling water. However, other sources (e.g., luminescent dials, sealed source equipment) may not have the same mix of radionuclides. The HRA should address the potential for other long-lived radionuclides to be present if there are other sources at Alameda NAS.

1&2. **PHNS Response**: As discussed in Section 1.1 of Volume I of the NAS Alameda HRA, Volume II of the HRA addresses general radioactive material (G-RAM), including all non-NNPP applications. A discussion of the aforementioned sources is presented in Volume II of the HRA.

SPECIFIC COMMENTS:

1. **TechLaw Comment**: Section 5.1.3, Table 5-4: Some inadvertent releases of radioactive materials may have contaminated areas away from the work sites where the material was used. This section of the HRA describes 13 reports related to potential radioactivity releases to the environment and the response actions that were taken. Of the 13 incidents, four (12/8/86, 8/29/89, 2/28/90, and 6/19/92) involved the loss of tools or a potentially radiological component that were never located. The response summaries indicate that surveys were conducted in the areas where the items were used and that there were no elevated radiation levels. However, the 12/8/86 incident does not clearly rule out the possibility that contamination was exported from the work area. The HRA should indicate whether the incident report concluded that the tool was or was not contaminated. If no such conclusion exists, the HRA should state whether or not the loss could be radiologically significant to the public.

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1. **PHNS Response**: The 12/8/86 incident occurred aboard a ship, resulting in the subject tool most likely being lost within the confines of the ship. Records do not identify the tool as having been radioactively contaminated. It had been controlled for use in a radiologically controlled area which was subsequently found to be free of loose contamination. Based on these factors, it is unlikely that the general public would have received significant, if any, radiation exposure as a result of this incident, even if the tool ever left the ship.

2. **TechLaw Comment**: Section 6.1.1, Table 6-1: The conclusion that no remedial work is required does not appear to be consistent with the data in Table 6-1. According to Table 6-1, sediments at several sampling sites had gross gamma levels greater than 4.5 pCi/cm^2 between 1966 and 1970. (After that time period, results were reported as pCi/g.) The NNPP limits (see HRA section 4.4) for radiologically controlled areas and for Controlled Surface Contamination Areas is 450 $pCi/100cm^2$ swipe sample (equivalent to 4.5 pCi/cm^2). The HRA should address the current status of the radiation levels at the monitoring locations with respect to the 4.5 pCi/cm^2 limit and explain why no action would be needed (e.g., isolation from the public due to depth below surface, these values do not exceed appropriate screening values for radiation in sediment, no dredging and use of bottom sediments is expected etc.).

2. **PHNS Response**: The pCi/cm^2 term used in Table 6-1 cannot be compared with the term used to describe swipe samples. While the swipe term refers to a wiped surface area, the Table 6-1 term refers to the surface area of the harbor bottom beneath which a dredge sample was taken. The Table 6-1 term therefore represents a volume of sample and is not comparable to a hypothetical underwater swipe. Also, it should be noted that the values above 4.5 pCi/cm^2 are gross gamma measurements over a wide energy range, and are consistent with the variability expected due to naturally occurring radionuclides. Table 6-1 data from 1978 on, when specific cobalt-60 began to be measured, shows that no cobalt-60 has ever been detected in NAS Alameda harbor sediment. (Section 4.2 of the HRA briefly identifies why cobalt-60 is a valid "tag" for potential NNPP radioactivity.)

3. **TechLaw Comment**: Section 6.1.1, Page 6-6: The dredge sampling technique described in the third paragraph does not appear to be adequate to determine the current fate of radiological contamination associated with the release of contaminated water to the San Francisco Bay in 1966. In 1966, a reported 0.187 Curies were released into the Bay (see page 5-6). Sediment sample analytical results presented in Table 6-1 show the highest reported gross gamma concentrations between 1966 and 1969 were higher than during later years. The data show a generally decreasing trend in gross gamma concentrations in sediments over time. This decrease may be attributed to

radioactive decay, especially for cobalt-60 with a 5.3 year half-life. However, the decrease may partially be a reflection of the sampling technique, which only samples the top half inch to one inch of the sediments. The sediments monitored between 1966 and 1969 may currently be buried by several inches or feet of sediment deposited over the past 30 years. The current samples would only contain radioactive materials that were deposited in the time period during which one inch of sediment was deposited. The HRA should provide information to show that dredging of the buried layers would not pose a public health concern.

3. **PHNS Response**: The only significantly elevated average gross gamma sediment result appears to have occurred in the first quarter of 1966, prior to the berthing of or work on nuclear-powered ships at NAS Alameda. It is expected that the variability seen throughout the Table 6-1 data is due to naturally-occurring radioactivity.

Any residual cobalt-60 radioactivity from 1966, if present, would have decayed to about one percent of its original concentration by now. Also, as discussed in Section 6.2 of the HRA, the area has been extensively and repeatedly dredged, and the total naturally-occurring radioactivity in the dredge spoils would greatly exceed the maximum radioactivity that could be present from NNPP activities. Hence, it would appear unlikely that any significant amount of activity would have consolidated into lower layers of the harbor floor. This is consistent with observations at other harbors where core samples have been taken; e.g., at San Diego Bay, only a trace level of cobalt-60 was detectable in a single core sediment sample, out of 15 samples taken by the EPA during their 1997 overcheck survey.

The Navy concludes that no significant exposure to the public or the environment would result from any residual cobalt-60 in harbor sediment, either that remaining in the harbor or that removed as dredge spoils.

4. **TechLaw Comment**: Section 6.3, page 6-20: The statement in the last sentence of the final paragraph, that radiation exposure to the general public in occupied areas surrounding the base is indistinguishable from natural background, does not appear to be accurate. Data in Table 6-1 indicates that perimeter values may be distinguishable from area-wide background levels, although the significance of the difference may be minor. A review of Table 6-8 shows that, at the low end of the reported ranges, 41 of the 61 quarterly perimeter values beginning in 1981 are higher than the corresponding background value. The perimeter values were as much as 48% higher (3rd quarter 1990). In general, the difference is much smaller, but a pattern of higher perimeter values can be seen beginning in 1981. Prior to 1981, the low, high, and average perimeter values are all less than the

corresponding background value. For the average values, 18 of the 61 perimeter values are higher than the background values. For the high end of the range, only 5 of the 61 perimeter values are higher than the background value. The HRA would be more accurate to indicate the significance of the values rather than stating that the exposures are indistinguishable from background. However, the table does not present enough information to determine if the elevated perimeter values are higher than the lowest background value due to elevated radiation levels at the site perimeter or because the lowest area-wide background values came from a location with low natural background radiation levels.

4. **PHNS Response**: Page 6-20 of the HRA notes that one of the background TLD locations was on a pier at Mare Island, to permit comparison of the lower natural radioactivity of water as opposed to paving, concrete, and masonry structures typical at NAS Alameda. Hence, it is logical that the majority of the lowest quarterly readings would appear among the population of background samples, rather than among the Alameda perimeter samples. No artificially elevated radiation levels at NAS Alameda are implied by these results.

Due to the variability in natural radiation levels both at Alameda and at offsite background locations, Navy TLD data cannot prove an absolutely zero dose increase due to Alameda activities. However, workload and ship presence varied from quarter to quarter with no differences visible in the Table 6-8 data; no difference can be distinguished for the last quarter monitored, when all nuclear-powered ships had gone and all radioactive material had been removed; and no variability is clearly identifiable between the Alameda data and the background data. In sum, this information supports the Navy conclusion that radiation to the general public in occupied areas surrounding the base was indistinguishable from natural background.